MATERIAL SAFETY DATA SHEET

Silicon Metal

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Silicon Metal (all grades)

Synonyms/Trade Names: Silicon Metal
CAS No.: 7440-21-3

MANUFACTURER:
Invensil
517 Avenue de La Boisse
73000 Chambery
France

EMERGENCY TELEPHONE NUMBERS:

CHEMTREC (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS [1]

	wt. %	CAS Registry #
Silicon (Si)	> 97	7440-21-3
Iron (Fe)	< 2	7439-89-6
Aluminum (Al)	< 2	7429-90-5

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

	EXPOSURE LIMITS 8 hrs. TWA (mg/m^3)	
	OSHA PEL	ACGIH TLV
Silicon	15(total) 5 (respirable)	10(total)
Aluminum	15	10

[1] Elemental analysis of the alloy. The manufacturer can provide a more detailed analysis, including other trace elements.

3. HAZARDS IDENTIFICATION

Improper handling of Silicon Metal can cause fire or deflagration. (See Section 5). Silicon Metal should be handled in accordance with National Fire Protection Association recommendations. This product can be handled safely if appropriate handling precautions are followed. The product does not represent a hazard to health, safety or environment when handled and stored as advised. (See Section 7). Flammable and noxious gases may be formed in contact with moisture, acids or bases. (See Section 10 and 11). Silicon Metal dust suspended in air may under certain conditions cause dust deflagrations. (See Section 10)

4. FIRST AID MEASURES

INHALATION:

Emergency Responders should use the appropriate respiratory protection when removing an affected victim to fresh air. Give artificial respiration if breathing has stopped. Call for prompt medical attention. (See Section 11)

SKIN CONTACT:

Wash skin with water and/or mild detergent. If irritation develops, seek medical attention.

EYE CONTACT:

Rinse eyes with large amounts of water/saline solution until no particles remain in eye. See a physician on persistent feeling of discomfort or if irritation occurs.

INGESTION:

If large amounts are swallowed, get prompt medical attention.

5. FIRE FIGHTING MEASURES

COMBUSTIBILITY:

When suspended in air, powders, fines or dust of Silicon Metal can readily be ignited, will propagate flame, and may generate considerable pressure and/or deflagrate. Silicon Metal should be handled so that fines do not become airborne in concentration that exceed the Minimum Explosive Concentration. Avoid generating sparks or ignition sources in areas of high airborne dust levels or in areas with accumulated dust. The degree of combustibility in air is dependent upon particle size, oxide coating, and quality of dispersion. The potential for silicon metal to combust in air increases with decreasing particle size. Thoroughly clean areas or equipment to be maintained prior to dust disturbing or ignition source generation activities. (See Section 10.)

AUTO IGNITION TEMPERATURE (dust layer):

Silicon Metal - 1650^{o}F (900^{o}C)

LOWER EXPLOSIVE LEVEL:

Silicon Metal - Greater than 160 g/m^{3}

COMBUSTION PRODUCTS:

Oxides of constituent elements.

MINIMUM IGNITION ENERGY:

780 millijoules

EXTINGUISHING MEDIA:

Class D fire: Use dry powder, dry sand, or CO_2 to smother fire. Fire may also be isolated and allowed to burn itself out. Do not disturb metal while extinguishing the fire.

6. ACCIDENTAL RELEASE MEASURES

LAND SPILL:

Silicon Metal spilled on the land represents minimal hazard. Cleanup personnel should wear appropriate respiratory protective equipment when addressing fine material. Avoid the use of compressed air to maneuver spills or leaks of fine material. Fine material should be swept up or vacuumed using explosion-proof equipment. Keep dry material and wet material separated. Place cleaned up material in disposal container. Avoid repackaging wet materials in sealed containers.

WATER SPILL:

Remove spilled product from water body by dipping or other appropriate means. Avoid repackaging wet materials in sealed containers.

7. HANDLING AND STORAGE

HANDLING:

Silicon Metal powders or fines can explode or deflagrate and should be handled to prevent fines from becoming airborne in concentration that exceed the Minimum Explosive Concentration. Avoid handling that generates dust build-up. Avoid inhalation of dust. (See Section 8). Avoid ignition sources (e.g. welding) in areas with high dust concentrations. Addition of wet product to molten metal may cause explosions. (See Section 10.)

STORAGE:

Silicon Metal must be kept in a dry and well-ventilated place, and away from acids and bases.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye protection, eye flushing facilities and protective gloves are recommended. Ensure adequate ventilation. Wear an appropriate particulate respirator in accordance with 29 CFR 1910.134 or CSA Standard Z94.4-M1982 for dust exposure that may exceed exposure limits. If adequate ventilation is not possible, then a self-contained breathing apparatus or an air supplied respirator is recommended.

OCCUPATIONAL EXPOSURE LIMITS (OSHA and ACGIH):

	8hr TWA mg/m^3	
	OSHA PEL	ACGIH TLV
Total inhalable dust	15	10
Respirable dust	5	3
Silicon	15 (total) 5 (respirable)	10(total)
Aluminum	15	10

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granular or Lump, 200 mesh or larger
Color:	Silvery metallic
Odor:	Odorless
Solubility (Water):	Insoluble
Melting Point (°C):	Approx. 1440 °C
Specific Gravity (water = 1):	Approx. 2.3

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:

Silicon Metal powders or fines can explode or deflagrate and should be handled to prevent fines from becoming airborne in concentration that exceed the Minimum Explosive Concentration. Silicon particles suspended in air can cause dust deflagrations. Avoid generating sparks and other ignition sources (e.g. welding) in areas with high dust concentrations. Addition of wet material to molten metal may cause explosions.

MATERIALS TO AVOID:

Acids and strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS:

Contact with acids may result in the generation of silane gas (SiH_4), a spontaneously combustible gas. Highly flammable hydrogen gas (H_2) may be formed if Silicon Metal comes in contact with moisture, acids or bases. A reaction with hydrofluoric acid (HF) or nitric acid (HNO_3) leads to the formation of toxic gases such as silicon tetrafluoride (SiF_4) or nitrous oxide gases (NOx). Wet product will form highly flammable hydrogen gas if added to molten metal, due to decomposition of water.

11. TOXICOLOGICAL INFORMATION

ACUTE EFFECTS:

INHALATION:

Finely divided dust may irritate and dehydrate mucous membranes.

SKIN CONTACT:

Dust may irritate the skin.

EYE CONTACT:

Dust may irritate and lead to dryness.

INGESTION:

Dust may irritate and dehydrate mucous membranes.

CHRONIC EFFECTS:

This material is not known to be a reproductive toxin, teratogen or mutagen.

12. ECOLOGICAL INFORMATION

Silicon Metal is not characterized as dangerous for the environment.

13. DISPOSAL CONSIDERATIONS

Avoid repackaging wet material in sealed containers. Dispose of in accordance with applicable federal, state, and local regulations. Silicon Metal is not a listed RCRA Hazardous Wastes (40 CFR 261).

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION):
Proper Shipping Name: Not regulated
Hazard Class: Not regulated
I.D. Number and Initials: Not regulated
Packing Group: Not regulated
Label(s): Not regulated

15. REGULATORY INFORMATION

OSHA (Occupational Safety and Health Administration)
Hazardous by definition of hazardous communication standard (29 CFR 1910.1200)

TSCA (Toxic Substance Control Act):
Components of this product are listed on the TSCA Inventory.

CERCLA (Comprehensive Response Compensation, and Liability Act):
Silicon Metal is not listed in 40 CFR 302.4.

RCRA (Resource Conservation/Recovery Act):
Silicon Metal is not a listed hazardous waste.

SARA TITLE III (Superfund Amendments and Reauthorization Act):
311/312 Hazard Categories:
Immediate Health, Delayed Health, Fire.
313 Reportable Ingredients:
None

CALIFORNIA PROPOSITION 65:
This product contains chemical(s) known to the State of California to cause cancer:
None

16. OTHER INFORMATION

APPLICATION OF SILICON METAL
Additive to metal in steel plants and iron foundries for production of steel, other metals and foundry products. Additive for ceramic production.

16. OTHER INFORMATION (Con't)

Literature references are available upon request from the manufacturer.

THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET RELATES TO THIS SPECIFIC MATERIAL. IT MAY NOT BE VALID FOR THIS MATERIAL IF USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. IT IS THE USER'S RESPONSIBILITY TO VERIFY THE SUITABILITY AND COMPLETENESS OF THIS INFORMATION FOR THE PARTICULAR USE INTENDED.